

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: HIROSHI KITAGUCHI ET AL  
Serial No.: TBD Group Art Unit:  
Filed: CAM #: 56209.013 Examiner:  
Title: RADIOACTIVE GAS MEASUREMENT APPARATUS AND  
FAILED FUEL DETECTION SYSTEM

PRELIMINARY AMENDMENT

Commissioner for Patents  
Washington, D.C. 20231

Sir:

Please enter the following amendments to the claims prior to the examination of the application.

IN THE CLAIMS:

Please amend the claims as follows:

(A copy of the marked-up version of the specification as amended is attached to this Preliminary Amendment).

1. (Amended) A radioactive gas measurement apparatus, comprising:  
a radiation detection system having a main detector and a sub-detector that are arranged at positions diametrically opposed to each other with respect to a sampling chamber, into or out of which a radioactive gas flows, and a shield for shielding a background radiation surrounding the detectors; and

an anticoincidence counter circuit in a measuring circuit, in which a particular radiation emitted from the radioactive gas is measured with an anticoincidence count processing using signals of both detectors,

wherein the main detector is a plate-shaped semiconductor detector having a  $t/L$  ratio of 1 or less.

2. (Amended) A radioactive gas measurement apparatus, comprising:

a main detector and a first sub-detector having the shape of a well and surrounding the main detector that are arranged at one of two positions diametrically opposed to each other with respect to a sampling chamber, into or out of which a radioactive gas flows;

a second sub-detector arranged at the other of the two positions; and

an anticoincidence counter circuit as a measuring circuit, in which a particular radiation emitted from the radioactive gas is measured with an anticoincidence count processing using signals of the main detector and two sub-detectors,

wherein the main detector is a detector made from a plate-shaped semiconductor having a  $t/L$  ratio of 1 or less.

3. (Amended) The radioactive gas measurement apparatus according to Claim 1, wherein the thickness of said plate-shaped semiconductor detector is between 2 mm and 7 mm.

4. (Amended) The radioactive gas measurement apparatus according to Claim 1, wherein said shield for shielding the background radiation is made of a material that does not emit a characteristic X ray within a range of energy from 70 to 90 keV inclusive.

5. (Amended) A failed fuel detection system, wherein radiation intensity emitted from Xe-133 contained in an off-gas in a reactor condensate system is measured by a radioactive gas measurement apparatus according to claim 1, the measurement values are collected on the time series, and the resulting time-series data is analyzed to detect a fuel failure in a reactor.

Please add the following new claims:

6. (New) The radioactive gas measurement apparatus according to Claim 2, wherein the thickness of said plate-shaped semiconductor detector is between 2 mm and 7 mm.

7. (New) The radioactive gas measurement apparatus according to Claim 2, wherein said shield for shielding the background radiation is made of a material that does not emit a characteristic X ray within a range of energy from 70 to 90 keV inclusive.

8. (New) A failed fuel detection system, wherein radiation intensity emitted from Xe-133 contained in an off-gas in a reactor condensate system is measured by a radioactive gas measurement apparatus according to claim 2, the

measurement values are collected on the time series, and the resulting time-series data is analyzed to detect a fuel failure in a reactor.

### REMARKS

Entry of the amendments to the specification, claims and abstract before examination of the application is respectfully requested. These claims have been amended to remove multiple dependencies, and are believed to patentably define over the prior art.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #381NU/50957).

Respectfully submitted,

February 28, 2002

  
James F. McKeown  
Registration No. 25,406

Kening Li, Ph.D  
Registration No. 44,420

CROWELL & MORING, LLP  
P.O. Box 14300  
Washington, DC 20044-4300  
Telephone No.: (202) 624-2500  
Facsimile No.: (202) 628-8844

## VERSION WITH MARKINGS TO SHOW CHANGES

1. (Amended) A radioactive gas measurement apparatus, comprising:

a radiation detection system having a main detector and a sub-detector that are arranged at positions diametrically opposed to each other with respect to a sampling chamber, into or out of which a radioactive gas flows, and a shield for shielding a background radiation surrounding the detectors; and

an anticoincidence counter circuit in a measuring circuit, in which a particular radiation emitted from the radioactive gas is measured with an anticoincidence count processing using signals of both [the] detectors,

wherein the main detector is a plate-shaped semiconductor detector [having a thickness less than a diameter of a surface thereof orthogonal to the thickness direction] having a t/L ratio of 1 or less.

2. (Amended) A radioactive gas measurement apparatus, comprising:

a main detector and a first sub-detector having the shape of a well and surrounding the main detector that are arranged at one of two positions diametrically opposed to each other with respect to a sampling chamber, into or out of which a radioactive gas flows;

a second sub-detector arranged at the other of the two positions; and

an anticoincidence counter circuit as a measuring circuit, in which a particular radiation emitted from the radioactive gas is measured with an anticoincidence count processing using signals of the main detector and two sub-detectors,

wherein the main detector is a detector made from a plate-shaped semiconductor having [a thickness less than a diameter of a surface thereof orthogonal to the thickness direction] a t/L ratio of 1 or less.

3. (Amended) The radioactive gas measurement apparatus according to Claim 1 [or 2], wherein the thickness of said plate-shaped semiconductor detector is between 2 mm and 7 mm.

4. (Amended) The radioactive gas measurement apparatus according to Claim 1 [or 2], wherein said shield for shielding the background radiation is made of a material that does not emit a characteristic X ray within a range of energy from 70 to 90 keV inclusive.

5. (Amended) A failed fuel detection system, wherein radiation intensity emitted from Xe-133 contained in an off-gas in a reactor condensate system is measured by [the] a radioactive gas measurement apparatus according to [one of Claims 1 to 4] claim 1, the measurement values are collected on the time series, and the resulting time-series data is analyzed to detect a fuel failure in a reactor.